



UNITED STATES MARINE CORPS  
MARINE CORPS COMBAT DEVELOPMENT COMMAND  
QUANTICO, VIRGINIA 22134-5001

IN REPLY REFER TO:

3900  
C443

From: Commanding General, Marine Corps Combat Development  
Command, 3300 Russell Road, Quantico, Virginia  
22134-5021 (C 443)

Subj: OPERATIONAL REQUIREMENTS DOCUMENT (ORD) FOR A LIGHT  
ARMORED VEHICLE (LAV) (NO. MOB 211.4.5); CHANGE 2

Ref: (a) DoD Regulation 5000.2-R

1. Purpose. To provide changes to the basic Operational Requirements Document (ORD) for the Light Armored Vehicle (LAV) (NO. MOB 211.4.5). Per the reference, the following changes to the ORD are approved.

2. Action

a. Insert into Annex C, LAV-Command and Control (LAV-C2), the following subparagraphs:

"3.d. The LAV-C2 requires a mission tailorable communications configuration that allows the commander to determine the mission specific C4I requirements to accomplish the mission."

1. The LAV-C2 external RF communications equipment must support the doctrinal voice and data circuits of the LAR command element, and be resident on the platform. Tactical Data Network (TDN) components such as servers and routers, and end user equipment like laptops, will be provided by the embarked staff.

2. The "docking stations" and data network cabling must support the use and employment of TDN, Data Automated Communications Terminal (DACT), Advanced Field Artillery Tactical Data System (AFATDS), Intelligence Analysis System (IAS), Tactical Combat Operations (TCO) and mobile SATCOM as part of the LAV-C2 organic communications suite. The reliability of each individual system will not be reduced when these systems are inserted into the LAV-C2.

3. The LAV-C2 requires the capability to communicate with Higher/Joint Headquarters and direct a deep precision strike using ground and seabased precision strike munitions at ranges of 300 miles (threshold) to 400 miles (objective).

4. The LAV-C2 requires the capability to receive data from the Joint Surveillance Target Attack Radar System (JSTARS), Unmanned Aerial Vehicles (UAV) and Unmanned Ground Vehicles (UGV) sensor platforms.

3. Filing Instructions. This change transmittal will be filed immediately following the signature page of the basic ORD.

4. The Marine Corps point of contact for this requirement is the Light Armored Vehicle Requirements Officer (C 443), Requirements Division, MCCDC, DSN 278-6206 commercial 703-784-6206.

JAMES P. O'DONNELL

Distribution:  
See attached



UNITED STATES MARINE CORPS  
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IN REPLY REFER TO:  
3900  
C 441  
JUL 01 1997

From: Commanding General, Marine Corps Combat Development  
Command, 3300 Russell Road, Quantico, Virginia  
22134-5021 (C 441)

Subj: OPERATIONAL REQUIREMENT DOCUMENT (ORD) FOR A LIGHT ARMORED  
VEHICLE (LAV) (NO. MOB 211.4.5); CHANGE 1

Ref: (a) DoD Regulation 5000.2-R

1. Background. There is a documented deficiency found in Mission Area Analysis 21 (Direct Fire and Maneuver) noting the lack of a turret azimuth indicator for all turreted armored vehicles. The lack of an azimuth indicator complicates tasks as diverse as precisely locating enemy forces, controlling supporting arms, and determining sectors of fire for on-board direct fire weapons.

2. Purpose. To transmit a change to the basic ORD for the LAV. Per the reference, the following changes are approved.

3. Action

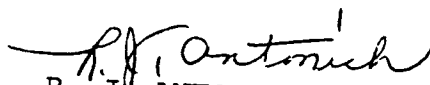
a. Replace paragraph 4a(4)(v) with the following:

"The LAV-25 and the LAV-AT require a product improvement that affords a turret main gun azimuth indication capability. The azimuth indication capability must provide the gunner or vehicle commander with an azimuth indication for main gun orientation and facilitate determination of target direction while stationary and on the move."

b. Add paragraph 4a(4)(w) "Possess those unique mission role variant requirements reflected in Annex B through H."

4. Filing Instructions. This change transmittal will be filed immediately following the signature page of the basic ORD.

5. The Marine Corps point of contact for this requirement is the Ground Combat Element Sponsor (C 443), Requirements Division, MCCDC, DSN 278-6206 or Commercial 703-784-6206.

  
R. J. ANTONICH  
By direction

Distribution: See attached



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3900  
C 443  
24 MAR 1998

From: Commanding General, Marine Corps Combat Development  
Command, 3300 Russell Road, Quantico, Virginia  
22134-5021 (C 443)

Subj: OPERATIONAL REQUIREMENTS DOCUMENT (ORD) FOR A LIGHT  
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Ref: (a) DoD Regulation 5000.2-R

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(1) The LAV-C2 external RF communications equipment must support the doctrinal voice and data circuits of the LAR command element, and be resident on the platform. Tactical Data Network (TDN) components such as servers and routers, and end user equipment like laptops, will be provided by the embarked staff.

(2) The interfaces and cabling of the organic LAV-C2 communications suite must support the use and employment of TDN, Data Automated Communications Terminal (DACT), Advanced Field Artillery Tactical Data System (AFATDS), Intelligence Analysis System (IAS), Tactical Combat Operations (TCO), and mobile HF/SATCOM. The reliability of each individual system will not be reduced when these systems are inserted into the LAV-C2.

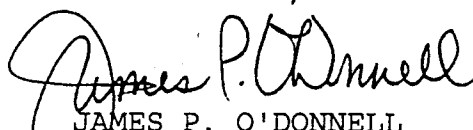
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(4) The LAV-C2 requires the capability to receive data derived from the Joint Surveillance Target Attack Radar System (JSTARS), Unmanned Aerial Vehicles (UAV), and Unmanned Ground Vehicles (UGV) sensor platforms."

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3. Filing Instructions. This change transmittal will be filed immediately following the signature page of the basic ORD.

4. The Marine Corps point of contact for this requirement is the Ground Combat Element Sponsor (C 443), Requirements Division, MCCDC, DSN 278-6206 commercial 703-784-6206.

  
JAMES P. O'DONNELL  
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20 FEB 1997

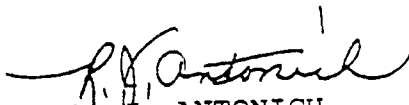
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Subj: OPERATIONAL REQUIREMENTS DOCUMENT (ORD) FOR A LIGHT  
ARMORED VEHICLE (LAV) (NO. MOB 211.4.5)

Ref: (a) DoDReg 5000.2-R

Encl: (1) Operational Requirements Document (ORD) for a Light  
Armored Vehicle (LAV) (NO. MOB 211.4.5)

1. Per the reference, on 12 December 1996 the Assistant Commandant of the Marine Corps approved the enclosure containing the ORD for a Light Armored Vehicle (LAV) (NO. MOB 211.4.5).
2. The Marine Corps point of contact for this requirement is the Ground Requirements Sponsor (C 443), Requirements Division, MCCDC, DSN 278-6206.

  
R. V. ANTONICH  
By direction

Distribution:  
See attached

PROPOSED  
OPERATIONAL REQUIREMENTS DOCUMENT  
FOR  
A LIGHT ARMORED VEHICLE

1. General Description of Operational Capability

a. Mission Area. This Operational Requirement Document (ORD) satisfies capabilities identified in Mission Area Analysis (MAA) 21, Direct Fire and Maneuver, dated 29 January 1996 and MAA 24, Fire Support, dated 26 May 1996.

b. System Description

(1) Family of Light Armored Vehicles (LAVs).

(2) Highly mobile with long range operational capabilities.

(3) Enhanced agility, firepower, lethality, and tactical and strategic mobility.

(4) Logistical self sustainability.

c. Operational Concept. The LAV supports Operational Maneuver From The Sea (OMFTS) and emerging ground operational concepts. Missions include reconnaissance, security, economy of force, and limited offensive and defensive actions.

d. Support Concept. The Marine Corps provides supply and support to the LAV through existing Department of the Navy three-level maintenance concept (organizational, intermediate, and depot) using common tools and general purpose test equipment to the maximum extent possible.

e. Mission Need Statement (MNS). In lieu of a MNS, the LAV has an approved Required Operational Capability (ROC), NO. MOB 211.4, dated 12 July 1989.

2. Threat. The following documents identify the threat:

a. System Threat Assessment. The Director, Marine Corps Intelligence Activity (MCIA) validated and approved the Systems Threat Assessment for the LAV dated August 1995.

b. Mid-Range Threat Estimate. Marine Corps Intelligence Activity Mid-Range Threat Estimate 1995-2005, dated November 1994.

c. Threat to be Countered. Refer to Annex A.

d. Projected Threat Environment. Refer to Annex A.

Subj: PROPOSED OPERATIONAL REQUIREMENTS DOCUMENT FOR A LIGHT ARMORED VEHICLE

3. Shortcomings of Existing System. The current LAV requires improvements in the areas of mobility, direct fire, fire support, and Command and Control (C2) to counter emerging threats. Specifically, Modifications and Pre-Planned Product Improvements are required in the following areas:

a. Current. The LAV has reliability problems with major subsystems that are currently degrading readiness and with old components that no longer perform at a level that is currently feasible with contemporary technology.

(1) LAV driver's vision. (MNS for an Armored Vehicle Driver's Thermal Viewer (NO. LOG 49) refers).

(2) Indirect fire support. (MNS for an LAV Enhanced Fire Support Platform (NO. MOB 31) refers).

(3) Anti-armor capability. (MNS for a LAV Advanced Antitank System (NO. MOB 30) refers).

(4) Situational awareness through data communications, electronic exchange of operational graphics, and advanced position locating and reporting systems. (MAA 11 refers).

(5) Target location and designation. (Marine Corps Lessons Learned System (MCLLS) 22650-67400 and 21049-40822, and MNS for the Lightweight Laser Designator Rangefinder NO. INS 1.17 refer).

(6) Trailer towing and employing minefield breaching line charges. (MAA 22 refers).

(7) Casualty evacuation. (MCLLS 40351-76497 refers).

(8) Secondary organic weapons system of sufficient range and lethality for self defense. (MCLLS 22550-53200 refers).

(9) Nuclear, Biological, and Chemical (NBC) monitoring and collective protection. (Marine Corps Master Plan (MCMP) 1994-2004 refers).

b. Projected. The current LAV is projected to reach the end of its service life between Fiscal Years (FYs) 2003 and 2007.

#### 4. Required Capabilities

##### a. Common System Performance

(1) Mission Scenarios. Refer to Annex A.



(2) Employment Tactics. Refer to Fleet Marine Force Manual (FMFM) 6-1 and FMFM 6-30 for LAV Tactics, Techniques, and Procedures (TTPs).

(3) Environmental Conditions. The LAV must be operational and maintainable in all types of climate and terrain where Marines deploy. The LAV must be capable of operating during full exposure to temperatures ranging from minus 25 degrees Fahrenheit (F) to 125 degrees F (-31.6 Celsius (C) to 51.6 C) (refer to U.S. Army Regulation 70-38 requirements for Hot and Basic Climates).

(4) Parameters. The LAV must:

(a) Swim inland or tidal water obstacles, without the use of external floatation (threshold). Water speed (no current) of 3 mph (4.9 kph) (threshold), 6.5 mph (10.5 kph) (objective), preparation time limited to five minutes.

(b) Be air transportable by all fixed wing transport aircraft (threshold), be transportable by CH-53E or heavy lift helicopter replacement (objective).

(c) Be highly mobile, lethal, reliable, supportable, and survivable.

(d) Maintain a road speed of 50 mph (80.5 kph) on hard surface primary roads (threshold); 62.5 mph (100.6 kph) (objective) (KPP).

(e) Achieve acceleration of 0-20 mph (0-32.2 kph) in 10 seconds on a dry, hard roadway (threshold); acceleration in 6 seconds (objective) (KPP).

(f) Brake from 20-0 mph in 35 feet (32.2-0 kph in 10.7 meters) on a dry, hard roadway (drift of no more than 3 feet (.9 meter) left or right) (KPP).

(g) Turn in less than 70 feet (21.3 meters) curb-to-curb.

(h) Possess a 400 mile (644 km) range (threshold) without refueling; 450 mile (724 km) without refueling (objective).

(i) Negotiate a vertical obstacle of 1.5 feet (0.46m) (threshold); 2.0 feet (0.61m) (objective).

(j) Climb a 60 percent slope and traverse a 30 percent slope.

(k) Operate on unimproved roads and cross-country; be capable of passing through light or medium vegetation and light man made structures such as fences.

(l) Operate (at reduced speed) in loose soils, snow, and ice (threshold); be equipped with a Central Tire Inflation System (objective).

(m) Possess a smoke generating, self masking capability.

(n) Possess an organic capability to minimize infrared, radio frequency, magnetic, acoustical, optical, and visual signatures.

(o) Be capable of assisted or self recovery; possess a slave start capability and be capable of towing like vehicles (KPP). LAV-Logistics (LAV-L) and LAV-Recovery (LAV-R) must be capable of towing any LAV variant, cargo trailers, or water trailers across level to moderately rolling terrain at reduced speeds.

(p) Possess organic equipment for preventive maintenance, battle position preparation, and self recovery (KPP).

(q) Possess a pintle mounted machine gun for self-defense (KPP). The pintle mount must accommodate the 7.62mm, .50 caliber, MK-19 40mm machine guns, or a laser designator system; the pintle mount must allow high angle of fire and 360 degree coverage as an objective requirement.

(r) Possess the following amphibious capabilities:

1 Remain fully operational, with normal maintenance, when exposed to the salt water and salt air inherent in amphibious operations (KPP).

2 Be transportable by existing U.S. Navy landing craft to include Landing Craft Air Cushion (LCAC) (KPP).

3 Be capable of fording at least 30 inches (762 mm) of salt water (with surf and wave actions). Fording and swimming equipment must not prevent or otherwise degrade combat performance (KPP).

(s) Provide 360° protection against 7.62 x 39mm ammunition, 0° obliquity at 0 meters, and 152mm artillery fragments from an airburst at 50 feet (15.24 m) (KPP). Objective requirements are:

1 Laser hardening of optics.

2 Protection against 5.56mm ball (NATO) and 5.45mm (Soviet 5.45x39) ammunition, 360° exposure, 0° obliquity, 0 meters range.

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3 Protection against 7.62 x 54R ammunition, 360° exposure, 0° obliquity, 0 meters range.

4 Protection against 12.7mm AP ammunition, 360° exposure, 0° obliquity, 300 meters range.

5 Protection against chemical energy antiarmor weapons by an onboard active protection system.

(t) Possess a communication suite to support the mission of each vehicle variant. All LAVs must:

1 Possess crew and passenger intercom (KPP).

2 Mount a Position Location Reporting System (PLRS) user unit (KPP).

3 Possess a self-contained or satellite based navigation system which provides location, heading, distance traveled (in kilometers), and range and bearing to one or more designated points (threshold) (KPP); possess internal connectivity between the host vehicle and external terminals to provide information to remote C2 nodes (objective).

4 Possess resident communications and computer systems that are compatible with common tactical radios (HF, VHF, UHF, SATCOM) (KPP).

5 Possess an onboard vehicle situational awareness system which provides rapid exchange and update of battlefield information.

6 Protect all vehicle communication equipment from vehicle-induced electromagnetic interference.

(u) Provide the following Countermeasures Pre-Planned Product Improvements. All LAVs must:

1 Incorporate a detection or countermeasure system to defeat active infrared, laser designators, millimeter wave radar, and proximity fuse munitions.

2 Incorporate an anti-tank guided missile countermeasure system.

(v) Possess those unique mission role variant requirements reflected in Annex B through H.

b. Logistics and Readiness

(1) Availability. The LAV must achieve a threshold operational availability of .85, with .9 as the objective

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ARMORED VEHICLE

requirement (based on assumed administrative and logistics delay time of 17 hours per operational mission failure) (KPP).

(2) Reliability. The LAV must achieve a minimum of 1950 Mean-Miles-Between-Mission-Failure (MMBMF) where mission length is 200 miles (322 km) and mission reliability is .9 (KPP).

(3) Maintainability. The LAV system design must provide quick replacement of equipment modules and easy access to parts that frequently fail.

(a) The mean time to perform daily PM must be one hour or less. The mean time to perform a weekly PM must be three hours or less.

(b) The Maximum-Time-To-Repair (MAXTR) or replace 90 percent of Line Replaceable Units (LRUs), based on naturally occurring replacement rates, at the organizational level must not exceed 2.5 clock hours of active maintenance time (KPP).

(c) The LAV must be resistant to high altitude EMP.

(d) The LAV must be NBC decontaminable, and possess a collective protection system. An automatic chemical agent detection and alarm system and a vehicular mounted radiac set are objective requirements.

(4) Durability. The LAV must demonstrate a .6 probability of completing 20,000 miles (32,200 km) of service without replacement or overhaul of the engine, transmission, transfer case, or differentials with a 50 percent confidence level. The vehicle will also have a .9 probability of no hull cracking or significant deformity of the hull, body, frame or major support members with a 50 percent confidence level (KPP).

5. Program Support. Joint potential designations are: U.S. Army--joint interest, U.S. Navy--joint interest, and U.S. Air Force--independent.

a. Maintenance Planning. The LAV is a Milestone IV program. The ILS for the LAV will be in accordance with established logistical support procedures.

b. Support Equipment. The LAV must provide automotive configuration that supports Simplified Test Equipment Internal Combustion Engine (STE/ICE) and other Test Maintenance Diagnostic Equipment (TMDE) commonly associated with automotive surety for military tactical vehicles.

c. Human Systems Integration

(1) Manpower Constraints

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ARMORED VEHICLE

(a) Marines with Military Occupational Specialty (MOS) 0313 will operate the LAV.

(b) Marines with MOS 2147 will provide 2d through 4th echelon maintenance for the LAV.

(2) Training Concept. School of Infantry, Marine Corps Base (MCB), Camp Pendleton, California will conduct entry level and leader training for LAV crewmen. The U.S. Army Ordnance Center and School, Aberdeen Proving Ground, Aberdeen, Maryland will conduct formal entry and intermediate level maintenance training for LAV personnel.

(3) Training Devices

(a) The LAV requires turret trainer mockups and full crew training simulators for institutional and follow-on training for LAV crewmen (MNS NO. TNG 1.14 for a Combat Vehicle Appended Trainer, MNS NO. TNG 1.04 for the Multiple Integrated Laser Engagement Simulation System, and ORD for the Precision Gunnery System refer).

(b) The LAV-25 requires a substitute or subcaliber firing device to support LAV-25 gunnery training subcaliber firing tables described in Marine Corps Warfighting Publication 3-1.4.2, and Marine Corps Order 1510.35C.

(c) The LAV-25 requires training practice ammunition ballistically matched to the current 25mm service ammunition to support firing tables in the previously cited documents.

(4) Safety Characteristics. The LAV must:

(a) Conform to Department of Transportation and Environmental Protection Agency requirements in effect at the time of vehicle production.

(b) Allow all personnel to change positions aboard the vehicle without exiting (KPP).

(c) Afford a 360° (6400 mils) field of vision for the vehicle commander, provide 120° (2133 mils) for the driver when buttoned-up, and provide a driver's night viewer device (KPP).

(d) Possess organic fire extinguishers for personnel and engine compartments (KPP); an automatic, non-toxic fire detection and suppression system is the objective requirement.

(e) Possess an emergency escape capability for all crew and passengers.

(f) Provide heating in the crew compartment (KPP); cooling is an objective requirement.

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ARMORED VEHICLE

(g) Possess flotation and crew restraint.

(h) Possess bilge pumps.

(i) Possess warning devices (audible alarms and/or lights) to alert crewmen to hazardous or faulty systems or conditions.

d. Standardization, Interoperability, and Commonality. The LAV must satisfy energy standardization and efficiency needs by possessing an engine that uses standard military fuels with no adverse impact; fuel consumption with standard military fuels may not vary by more than 25 percent (KPP).

6. Force Structure

a. Number of Systems

Org	LAV-25	LAV-AT	LAV-M	LAV-C2	LAV-L	LAV-AD	LAV-R	Total
I MEF	106	28	14	17	29	16	11	221
II MEF	60	16	8	8	16	0	6	114
III MEF	14	4	2	1	3	0	1	25
SMCR	60	16	8	8	16	0	6	114
SPT EST	28	4	3	3	5	1	5	49
EEAP	13	4	2	1	2	0	1	23
WRMR	51	12	6	4	9	0	1	83
MPF	42	12	6	3	9	0	3	75
DMF	32	9	4	4	7	0	4	60
Total	406	105	53	49	96	17	38	764
On Hand	401	95	50	50	94	0*	45	735

\* Procurement is planned during FY97 with fielding expected in FY98.

b. Additional Allowances. The following additional allowances are not included in the table above.

(1) Marine Forces Atlantic and Pacific are authorized 6 Mobile Electronic Warfare Support System (MEWSS) vehicles each. Marine Forces Pacific is further authorized one LAV-R to support the MEWSS within 1st Radio Battalion.

(2) CG, I MEF has a planned allowance for 4 LAV-C2 systems and III MEF has a planned allowance for 2 LAV-C2.

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(3) The Enhanced Equipment Allowance Pool (EEAP), Twenty-nine Palms CA has Planned Allowances for 2 LAV-25s, 2 LAV-Rs, 1 LAV-AT, 1 LAV-M, 1 LAV-L, and 1 LAV-C2.

d. Current Inventory. The current inventory of LAVs does not meet the specific requirements cited above. War Reserve Material Requirements (WRMR) and Depot Maintenance Float (DMF) are being used to fill deficiencies and planned allowances in Marine Expeditionary Forces, the supporting establishment and the EEAP.

7. Operational Capability Considerations

a. Initial Operational Capability (IOC). The current LAV achieved IOC during 1984.

b. Full Operational Capability (FOC). The current LAV achieved FOC during 1987.

## LAV Mission Profile and Mission Duration

1. Purpose. To provide standard operational guidelines to support Developmental and Operational Testing for LAV enhancements and modifications.

### 2. Mission Profile

#### a. System Threat based on Operational Environment.

(+ High threat, 0 Medium threat, - Low threat)

THREAT	EUROPE	KOREA	SOUTHWEST ASIA
Artillery	+	+	0
Tank Main Gun	+	-	0
Armored Fighting Vehicles	+	-	+
Small Cal Guns	+	+	+
Rocket Propelled Grenade's	+	0	+
Small Arms	+	0	+
Gnd Launch ATGM	+	0	0
Close Air Support	0	-	0
Chemical	0	-	0

#### b. Environmental Operating Conditions.

(+ High likelihood, 0 Medium likelihood, - Low likelihood)

ENVIRONMENT	EUROPE	KOREA	SOUTHWEST ASIA
Day	+	+	+
Night	+	+	+
Electronic Warfare	+	-	0
Smoke	+	+	0
Haze/Fog	+	0	-
Dust	-	-	+
Rain	+	-	-
Urban	+	+	-
Snow	+	+	-



c. Mission. Percent of time.

Scenario	Offense	Defense	Total
Europe	20	80	100
Korea	40	60	100
SWA	80	20	100

d. Type of Target. Estimated percentage of total LAV targets.

Tanks	1%
LAVs	60%
Personnel	10%
Bunker/Urban	15%
A/C Fixed wing/Helicopter	3%
Other (Trucks, Arty, AD Wpns, Material)	11%
Total	100%

e. Engagement Range Distribution. (Percentage of total target engagements by range in meters)

Mission	0-200	200-400	400-800	800-1200	1200-1600	1600-2000	2000-2800
Offense	1%	1%	2%	4%	15%	17%	60%
Defense	1%	1%	2%	3%	8%	12%	73%

f. Combat Demands

<u>Road Movements</u> (% traveled)	<u>Offense</u>	<u>Defense</u>
Primary Roads	30	40
Secondary Roads	30	40
Cross Country	40	20
Total	100	100

<u>Running Time</u> (In Hours)	<u>Offense</u>	<u>Defense</u>
Engine Idle	5	6
Maneuver	12	8
Total	17	14

<u>Mission Events</u>	<u>Offense</u>	<u>Defense</u>
Mission Miles	125	75
Time Starts	3	4
Radio Operations (Hours)	20	20
Weapon Station Operations (Hours)	2	4

g. Sample 24 Hour Combat Mission for LAV-25

Mode	Static	Dynamic	Average
Shoot	100 Rds.	100 Rds.	100 Rds.
Move	25 Miles	100 Miles	77.5 Miles
Communicate	6 Hours	24 Hours	18.6 Hours
Expected %	30%	70%	

<u>Movement Terrain</u>
30% Primary Road
30% Secondary Road
40% cross-country

3. Mission Duration. A typical mission duration is 48 hours and includes traveling 155 miles over a variety of terrain, through any and all environmental and weather conditions.

### LAV-25 Specific Requirements

1. Function. The LAV-25 is a fighting vehicle that is adaptable to a wide range of offensive, defensive, and reconnaissance tasks throughout the operational continuum.
2. Crew. The LAV-25 crew consists of seven Marines: driver, gunner, commander, and mounted four man scout infantry team.
3. Main Armament. The LAV-25 main gun must deliver rapid, automatic fire with a high probability of kill against light armor and material targets such as vehicles, crew served weapons, and personnel. The LAV-25 must possess a 360° field of fire; the capability to defeat slow-moving aircraft is an objective requirement. The turret must provide power operation with manual backup and possess a threshold minimum elevation and depression of +60° (1066 mils) and -8° (-142 mils) respectively within the 90° frontal arc; the objective requirement is +80° (+1422 mils) elevation and -10° (-177 mils) depression.
4. Secondary Armament. The LAV-25 requires a 7.62mm coaxial machine gun that uses the primary armament sights and controls and provides manual backup firing for engaging light vehicles, crew served weapons and personnel.
5. Stabilization. The LAV-25 main and secondary armament must be stabilized. Specific requirements:
  - a. Main and secondary armament must move no more than 0.5 mil in 20 seconds (when adjusted to null drift).
  - b. The stabilization system must function at the same rates with which the turret drive functions.
  - c. The stabilized weapons must not exhibit errors in elevation greater than 2 mils, operating on a RRC-9 profile 4 bump course, at speeds between 9 to 11 mph (14.5 to 17.7 kph).
6. Fire Control. The LAV-25 onboard fire control must provide for accurate fire and simple operations. The commander and gunner must both be able to sight and fire the main cannon and coaxial machine gun. A stationary vehicle must have a three round burst Probability of Hit (Ph) of .8 at 2000m on a BMP (front aspect, stationary target); a LAV moving at 11 mph must have a three round burst Ph of .65 at 1500m on a BMP (front aspect, stationary target). The LAV-25 sight will possess an eye safe laser range finder as an objective requirement. The LAV-25 sight requirements are found in the LAV-25 Day/Night Sight ORD, NO. MOB 211.4.8, dated 22 December 1993.

ANNEX B

### LAV-Command and Control (LAV-C2) Specific Requirements

1. Function. The LAV-C2 must possess the tactical communication and computer capability to support the fire support and maneuver requirements of a battalion or company commander during amphibious operations and subsequent operations ashore.
2. Crew. The LAV-C2 crew consists of two Marines: a commander and driver, with work stations for a minimum of five non-organic staff personnel.
3. Communication Equipment
  - a. The LAV-C2 must accommodate the Command, Control, Communication and Computer systems of the Marine Corps Air-Ground Task Force (MAGTF) C4I Software Baseline.
  - b. The LAV-C2 requires internal communications for two-way voice communications between all stations.
  - c. The LAV-C2 design and system interfaces must provide for simultaneous operation of radio and intercommunications with no interference to other crew or station functions.

### LAV Recovery (LAV-R) Specific Requirements

1. Function. The LAV-R must possess a repair and recovery capability for all LAV variants.
2. Crew. The LAV-R crew consists of three Marines; driver, rigger, and commander.
3. Maintenance and Recovery Equipment. The LAV-R must possess:
  - a. A battle damage repair and recovery capability, which includes an air compressor, metal cutting and welding capability.
  - b. An enhanced slave start capability.
  - c. A winch and spade capable of recovering a LAV-25 in wheel depth mire; the objective is recovery of a fender depth mired LAV-25.
  - d. A boom capable of lifting the turret and engine of a LAV out of the hull for corrective maintenance.
  - e. Storage for critical tools and spare parts.

## LAV Anti-Tank (LAV-AT) Specific Requirements

1. Function. The LAV-AT must be able to effectively acquire and destroy threat main battle tanks to allow the Light Armored Reconnaissance unit perform its mission when faced with enemy armored formations.
2. Crew. The LAV-AT crew consists of four Marines: a driver, gunner, commander, and loader. Full mission capability with three personnel is the objective requirement.
3. Main Armament. The LAV-AT main armament must destroy threat main battle tanks beyond the range of enemy tank main guns. The system's threshold armament is the TOW II series missile. The system's objective armament is a fire and forget anti-tank weapon system with capability to engage on the move. Additionally the system must accommodate ground mounting when necessary.
4. Employment. The LAV-AT must possess a high degree of mobility and agility. It must be capable of rapid transition from moving to a target engagement. The system must be capable of firing from a short halt as a threshold requirement, firing while moving as an objective requirement. The LAV-AT must be capable of firing two missiles without reloading. The crew must be able to acquire targets, fire and reload from inside the vehicle under armor protection.
5. Environment. The LAV-AT must be able to acquire, engage, and destroy the enemy with its main armament in a 360° field of fire, day or night, and under obscured conditions of smoke, fog, haze and dust.
6. Fire Control. The LAV-AT must have a Ph of .75 (objective .9) with its main armament at the maximum effective range of the weapon.
7. Secondary Armament. The LAV-AT secondary armament must satisfy the threshold requirements specified in paragraph 4a(4)(p). Additionally the machine gun must be sighted and fired while using the main armament sighting and fire controls as an objective requirement.

### LAV Mortar (LAV-M) Specific Requirements

1. Function. The LAV-M must be able to deliver indirect fires to harass, neutralize, or destroy threat forces so that the Light Armored Reconnaissance unit can continue to perform its mission.
2. Crew. The LAV-M crew consists of six Marines; driver, gunner, two mortar men, vehicle commander, and plotter. Full mission capability with three personnel is the objective requirement.
3. Main Armament. The LAV-M must provide effective fires to suppress or neutralize light armor and material targets, such as vehicles and crew served weapons. The LAV-M must also provide rapid and accurate fires against dismounted personnel. The LAV-M must be capable of covering a 360° field of fire (6400 mils) and must range targets within the frontage of a LAR company. The threshold range of the main armament is 9000 meters; 12,000 meters is the objective requirement. Additionally the system must accommodate ground mounting when necessary, as an objective requirement.
4. The LAV-M secondary armament must satisfy the threshold requirements specified in paragraph 4a(4) (p).
5. Ammunition. The LAV-M must be capable of delivering High Explosive, Illumination, and Red Phosphorus smoke ammunition; Improved Conventional Munitions (ICM) and antiarmor warheads are objective requirements.
6. Response Time. The LAV-M must be capable of responding to calls for fire (from vehicle stop to first round fired) within one minute; thirty seconds is the objective requirement.



### LAV Logistics (LAV-L) Specific Requirements

1. Function. The LAV-L must be able to carry enough on board supplies to provide logistical support of the LAR unit.
2. Crew. The LAV-L crew consists of two Marines: a driver and a vehicle commander.
3. Cargo Compartment. The LAV-L must have an unobstructed, level floor configured to prevent slippage of cargo during movement and to maximize payload weight and volume; a self-loading and unloading capability and the capability to accept litters, for transportation of casualties are objective requirements.
4. Payload. The LAV-L must be capable of carrying a tactical internal load of 5,400 lbs.
5. Hatches. The LAV-L must possess roof and rear hatches. The rear hatch access must be compatible with North Atlantic Treaty Organization (NATO) standard pallets and permit loading and unloading by forklift. The LAV-L overhead hatches must be equipped with a manual boom or crane for loading and unloading as an objective requirement.

ANNEX G

## LAV-Air Defense (AD) Specific Requirements

1. Function. The LAV-AD must be capable of providing air defense coverage for the LAR unit supported.
2. Crew. The LAV-AD crew consists of three Marines: driver, gunner, and vehicle commander.
3. Main Armament. The LAV-AD must possess both a gun and a missile. The gun system must be capable of engaging ground targets at a threshold range of 2500 meters; the objective range is 7000 meters. Additionally the capability to engage targets in all weather conditions in daylight or darkness is the objective requirement.
4. Acquisition and Tracking System. The LAV-AD must:
  - a. Detect both fixed and rotary wing aircraft, detection while the LAV-AD is moving is the objective requirement.
  - b. Possess an automatic tracking capability; the tracking system must be compatible with the acquisition means.
  - c. Possess the capability to engage air targets with fixed optical sights and manual tracking.
  - d. Detect, acquire, and track air targets at 20 kilometers when integrated into the Marine Air Command and Control System.
  - e. Possess a turret with a 360° field of fire.
  - f. Possess an Identification Friend or Foe (IFF) capability.
5. Employment. The LAV-AD must:
  - a. Possess the capability to engage targets within 10 seconds of acquisition.
  - b. Minimize ammunition reload time.
6. Additional LAV-AD Employment Information. Refer to U.S. Marine Corps Operational and Organizational Concept for the LAV-AD dated 29 October 1993; CG MCCDC Clarification of the ROC for the LAV-AD dated 27 September 1994; and the Concept of Employment for LAV-AD dated 22 March 1995.

ANNEX H